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ABSTRACT OF THE DISCLOSURE

A gas stream vortex mixing system for mixing gas is provided. The gas stream vortex mixing system includes a duct provided with an outer surface defining an interior passageway operable for communicating a gas. The gas stream vortex mixing system further includes at least one nozzle and at least one wing. The wing is disposed within the interior passageway of the duct and is operable for generating at least one vortex. The nozzle is disposed within the interior passageway of the duct. The nozzle is operable to discharge a mixture into the interior passageway of the duct. The present invention provides a method of mixing gas by creating a predictable and ordered vorticity. The method includes providing the gas stream vortex mixing system and providing a supply of combustion gas into the interior passageway of the duct such that the combustion gas passes about at least one of the wings of the gas stream vortex mixing system generating a vortex. The method further includes discharging the mixture from at least one nozzle into the vortex such that the mixture is homogenized with the combustion gas within the vortex.